

**CLAIMS**

1. A microwave tube comprising an electron gun (12) generating an electron beam (20) in a cylindrical microwave structure (14, 50) of the tube, the microwave structure delivering a microwave at one output, a collector (16, 58, 82, 92) for collecting electrons from the beam comprising at least one electrode that is mechanically coupled to the microwave structure via a dielectric (62, 94), the mechanical coupling forming a radial waveguide for propagating spurious microwave radiation ( $P_r$ ) from the tube, characterized in that, in order to attenuate the spurious radiation from the tube, the radial waveguide includes at least one quarter-wave microwave trap having, at least at the operating frequency  $F$  of the tube, an open circuit for the microwave propagating in said radial waveguide for propagating spurious radiation.
2. The microwave tube as claimed in claim 1, characterized in that it includes a microwave trap at the operating frequency  $F$  of the tube, having a cylindrical slot (104, 114) collinear with the axis of revolution  $ZZ'$  of the tube and emerging in said radial waveguide for coupling the body (90) to the collector (92) of the tube.
3. The microwave tube as claimed in claim 2, characterized in that it includes another microwave trap at a frequency  $2F$ , having another cylindrical slot (108, 116) collinear with the axis of revolution  $ZZ'$  of the tube and emerging in the radial waveguide for coupling the body to the collector of the tube.
4. The microwave tube as claimed in either of claims 1 or 2, characterized in that the collector (96) includes a circular slot (104, 114) around the  $ZZ'$  axis with a rectangular cross section and a depth equal to  $\lambda/4$ , the slot emerging via one side in the radial

waveguide (Wg),  $\lambda = c/F$  being the wavelength at the operating frequency F of the tube, the slot being at a distance d1 from the point where the radial waveguide emerges on the same side as the internal opening (95) 5 of the collector (92), such that:

$$d1 = (\lambda g/4 + k\lambda g/2)$$

- $\lambda g$  being the wavelength in the radial waveguide;
- k being zero or an integer; and
- 10 - c being the velocity of light in the medium in question.

5. The microwave tube as claimed in claim 2, characterized in that the collector (92) includes a 15 second slot (108, 116) of circular shape around the ZZ' axis, having a rectangular cross section and a depth equal to  $\lambda/8$ , said second slot emerging alongside the slot in the radial waveguide, the second slot being at a distance d2 from the point where the radial waveguide 20 emerges on the same side as the internal opening (95) of the collector (92) such that:

$$d2 = (\lambda' g/4 + k'\lambda' g/2),$$

with k' being an integer and  $\lambda' g$  being the wavelength in the radial waveguide (Wg) at the 25 frequency 2F.

6. The microwave tube as claimed in one of claims 2 to 5, characterized in that the waveguide has, at its input at "ed", a zero impedance or an impedance of very 30 low value ( $V_{ed} \approx 0$ ).

7. The microwave tube as claimed in one of claims 1 to 6, characterized in that the collector is of the "depressed collector" type comprising several 35 mechanically coupled electrodes, each coupling between two consecutive electrodes forming a radial waveguide for propagating spurious microwave radiation (Pr) from the tube, characterized in that, in order to attenuate the spurious radiation from the tube, the radial

waveguide between two consecutive electrodes includes at least one quarter-wave microwave trap having, at least at the operating frequency F of the tube, an open circuit for the microwave propagating in said radial 5 waveguide for propagating spurious radiation.

8. The microwave tube as claimed in one of claims 2 to 7, characterized in that but the slots are filled with dielectric, of low dielectric constant,  $\epsilon_r(> 1)$ ,  $\lambda$ , 10 as well as the length of the slots, being reduced in the ratio of the square root of  $\epsilon_r$  relative to the case in which the slots are in a vacuum.

9. The microwave tube as claimed in one of claims 2 15 to 6, characterized in that one or more slots are in air.